current, voltage and duty cycle determining the relative contribution of each light source effecting a different spatial intensity distribution and color spectrum.

Claims:

In reply to point 3 and 4 – Claim Objections: *Claims 28, 29, 31 and 34 are objected to because of the following informalities...and claims 29-34 and 35 are objected as being in improper dependant claim number:*

Cancel all claims of record 28-35 and substitute new claims 36 – 49

36. [28] A multiple light source illuminating device capable of providing light at optimal levels of illuminance and color spectrum to predetermined surfaces within a geometric living space comprising:
    (a) a first light source having a spectral color distribution and having a substantial directionality of spatial light intensity distribution that is capable of being aimed at a specific surface in the living space; and
    (b) an illuminating device structure, said structure having means of being oriented relative to the geometry living space; and said structure having surfaces and apparatus for the mounting of a plurality of light sources thereon; and
    (c) said first light source mounted on the structure wherein the spatial light distribution of said first light source is aimed at a first surface in the living space; and
    (d) one or more additional light sources having a spatial light intensity distribution and spectral color distribution mounted to said structure where the spatial light intensity distribution of the additional light source is aimed at additional surfaces in the living space,

whereby the greater and lesser concentration of the light sources at particular orientations and aimings on the surface of the illuminating device structure controls the illuminance and color spectrum provided to the predetermined surface areas within the living space allowing for their optimization.

37. [new] The multiple light source illuminating device of claim 36 capable of providing light at optimal levels of illuminance and color spectrum to predetermined surfaces within a geometric living space further comprising:
    (a) a first light source having a spectral color distribution and having a substantial directionality of spatial light intensity distribution that is capable of being aimed at a specific surface in the living space; and
    (b) an illuminating device structure, said structure having means of being oriented relative to the geometry living space; and said structure having surfaces and apparatus for the mounting of a plurality of light sources thereon; and
    (c) said first light source mounted on the structure wherein the spatial light distribution of said first light source is aimed at a first surface in the living space; and
    (d) one or more additional light sources having a spatial light intensity distribution and spectral color distribution mounted to said structure where the spatial light intensity distribution of the additional light source is aimed substantially towards said first surface so that the illuminance and color spectrum on the surface is provided at the optimal level; and
    (e) further additional light sources having a spatial light intensity distribution and spectral color distribution mounted to the said structure and aimed at additional surfaces in the living space to the extent wherein the optimal levels of illuminance and color spectrum to each of the additional surfaces is provided,

whereby the greater and lesser concentration of the light sources at particular orientations and aimings on the surface of the illuminating device structure controls the illuminance and color spectrum provided to the predetermined surface areas within the living space allowing for their optimization.

38. [new] The illuminating device of claim 37 wherein the optimal illuminance level is uniform illumination over the surfaces at a certain height within the living space whether said surface is directly below the illuminating device or off in a distant corner.

39. [new] The illuminating device of claim 37 wherein the optimal illuminance is increased task lighting illuminance in a certain area of the living space and general lighting illuminance level over the rest of the area.

40. [new] The illuminating device of claim 37 wherein said structure is specifically oriented relative to the geometry living space by being affixed to a surface therein.

41. [new] The illuminating device of claim 37 wherein the light sources are groupings of more than one light source mounted to said structure and where the spatial light distribution aimings of the group light sources are substantially similar.

42. [29] The illuminating device of claim 37 is a lighting application oriented luminaire based on the visual tasks to be carried out within the living space designed according to principles of lighting practice, providing controlled illumination intensity, spectrum, luminous exitance and spatial distribution of intensity and spectrum, suited to the specific lighting application, comprising multiple light sources mounted on said structure, capable when operating in combination, of providing the correct intensity, spectrum, and spatial distribution of intensity, luminous exitance and spectrum for the living space to be illuminated.

43. [30] The illuminating device of claim 41 wherein the intensity, spectrum, and spatial distribution of intensity and spectrum is adjusted for changes in the living space to be illuminated in accordance with the lighting application comprising: a) a means for sensing the changes and b) a means for changing the light emanating characteristics of the light sources, thereby providing the correct intensity, spectrum, and spatial distribution of intensity and spectrum as a function of time.

44. [31] The illuminating device of claim 36, wherein the illuminating device has structure and is a luminaire having functional, accepted comfort and aesthetic characteristics providing controlled illumination comprising:

a) a plurality of light sources having light intensity, spatial light intensity distribution and spectral characteristics, and where said light sources are in mechanical and electrical communucation to the structure such that the spatial light intensity distribution of said independent light sources is having a directionality to said structure and position on said geometric support structure, and

c) wherein the mounting to provide spatial light intensity distribution characteristic, spectral wavelength characteristic, position and directionality of a light source is determined by using lighting equations to calculate the required light source properties according to one or more of the lighting application requirements, and

d) where said lighting requirements include calculatable items from the list comprised of: illuminance, color temperature and color rendering over the living space to be illuminated and

e) where the luminaire design criterion include any items from the list comprised of: luminous intensity, spectral wavelength distribution, the requirement of maintaining an acceptable continuum of spatial illumination and the requirement of maintaining an acceptable continuum of spatial color effects and the requirement of maintaining an acceptable glare rating for the luminaire, and

f) where the said structure has a considered geometry determined by the requirement of supporting the said independent light sources at the proper aimings and positions on the surface, and

g) where size, shape and coloring of the said support structure is also function of one or more considerations including containing the light sources, the functional ancillary equipment and aesthetic considerations.

45. [32] The illuminating device of claim 42, further comprising elements selected from the group consisting of:

a) a power supply element providing current at a voltage to the light sources and other ancillary equipment; and,

b) a differentiated power supply element capable of varying power to said independent light sources having means to effect the sending or not sending an independent electric

power signal differentiated in voltage, current or frequency to each light source or group of light sources; and,

c) a controller for adjusting the power to the light sources to such that a particular amount of power supplied to the light source generates a corresponding intensity and provides the correct intensity, spectrum, and spatial distribution of intensity and spectrum for the application; and,

d) a storage media device capable of storing and recalling stored data relating to performance, algorithms, lighting parameters and,

e) a controller capable of receiving inputs and by means of recalling stored parameters, processing algorithms, and calculating results, generates output control signals to adjust the illumination according to correct lighting practice; and,

f) a photosensor for providing light spectrum and intensity information to the controller, said information for use in said adjusting; and,

g) a motion detector for providing occupant sensing information to the controller, said information for use in said adjusting; and,

h) a communications element coupled to the controller comprised of a receiver for receiving a data signal from an external device, and,

i) a communications element coupled to the controller comprised of a transmitter for transmitting a data signal to an external device, and,

j) a remote control man-machine interface input device capable of communicating data with the communications element; and,

k) a machine vision system comprised of an imaging device, object recognition and,

l) optical elements situated proximate to each individual light source, groupings of light source or all the light sources to control the direction of the emanating light, where the term optical refers methodologies used for redirecting light rays through any of the known phenomenon including: reflection, refraction and diffraction,

m) a mechanical assembly for the support of light sources, power supplies, controllers, sensors and other ancillary equipment and,

n) a satellite reflector receiving light from the luminaire and redirecting said light to illuminate a distant area.

46. [33] The illuminating device of claim 45, wherein said controller is selected from the list consisting of,

a) an open-loop controller, factory programmed, for use in general lighting according to correct lighting practice: and,

b) an open-loop controller, user-programmed, by use of a programming method taking into account the lighting requirements of the environment in which the luminaire is to be used: and;

c) a closed loop controller, user-programmed, by use of a programming method taking into account the lighting requirements of the environment in which the luminaire is to be used; and,

d) a closed loop controller user-programmed, by use of a programming method taking into account the lighting requirements of the environment and self-adjusting in response to the changing lighting requirements of the environment in which the luminaire is located: and,

e) a closed loop controller, self-adjusting in response to the lighting requirements of the environment in which the luminaire is located, without pre-programming.

47. [34]A method for constructing a multiple light source illuminating device capable of providing light at optimal levels of illuminance and color spectrum to predetermined surfaces within a geometric living space comprising the steps of:

(a) providing the illuminating device with a structure which is capable of being oriented to the geometry of the living space; and

(b) providing said structure elements for mechanically and electrically joining the light sources to the structure; and

(c) positioning light sources in greater and lesser concentration at particular orientations and aimings on the surface of the illuminating device structure to provide meted illuminance and color spectrum to differently positioned and distanced surface areas within the living space whereby the illuminance and spectrum is at optimal levels.

48. The method of claim 47 further comprising the steps of:

(a) determining the illuminance and spectrum requirements of the lighting application and visual tasks to be carried out within the living space; and
(b) determining the illumination area, distances of from the illuminating device of the surfaces within the living space to be covered; and
(c) determining the light source intensity, spatial intensity distribution, spectral wavelength characteristic and directionality aimings of the multiple light sources mounted on said structure which meet the said illuminance requirements.

49. [35] The method for designing the illuminating device of claim 47, designed according to lighting practice, providing light intensity, spectrum, flare related luminous exitance and spatial distribution of intensity and spectrum, suited to the living space to be illuminated further comprising steps selected from the group consisting of:

(f) determining the lighting application, and the recommended lighting practices, illumination and glare ratings required for the application; and
(g) determining the luminaire mounting height, illumination area covered and surrounding conditions of the application; and
(h) determining light power required to effect the required illumination over the area; and
(i) selecting light sources capable of producing required intensities and spectrum at highest conversion efficiencies at lowest economic cost; and
(j) determining light source beam spreads; and
(k) determining light source aimings for the required distribution pattern; and
(l) determining electronics to control and power light source; and
(m) determining lighting fixture surface geometry size and glare rating; and
(n) testing whether the glare rating for the viewing angle is acceptable; and
(o) if the glare rating is not acceptable, changing light source beam spread and fixture geometries, or size, resulting in an acceptable glare rating; and
(p) when the glare rating is acceptable, then designing the luminaire aesthetics for the application.

Conclusion

The applicant submits that the claims are now in proper form and that the claims all define patentability over the prior-art. The claims have been amended so that they are proper, definite and define novel structure and method which is also not obvious. Therefore the applicant submits that this application is now in condition for allowance, which action he respectfully solicits.

Conditional Request for Constructive Assistance

Should the examiner still prefer to have these new and updated claims amended to more clearly highlight the uniqueness of the present invention, the pro se applicant requests under M.P.E.P. § 2173.02 and §707.07(j) that the examiner should draft one or more claims for the applicant and indicate in his or her action that such claims would be allowed if incorporated in the application by amendment. This request is in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully,

Yechezkal Evan Spero
74 Moshav Tifrach
M. P. Hanegev 85102
Israel
Tel: +972-54-440-7280
Fax: +972-8-996-0324
yspero@netvision.net.il

The following is a corrected complete list of the claims pursuant to 37CFR 1.121.

Claims:

36. [28] A multiple light source illuminating device capable of providing light at optimal levels of illuminance and color spectrum to predetermined surfaces within a geometric living space comprising:

(e) a first light source having a spectral color distribution and having a substantial directionality of spatial light intensity distribution that is capable of being aimed at a specific surface in the living space; and

(f) an illuminating device structure, said structure having means of being oriented relative to the geometry living space; and said structure having surfaces and apparatus for the mounting of a plurality of light sources thereon; and

(g) said first light source mounted on the structure wherein the spatial light distribution of said first light source is aimed at a first surface in the living space; and

(h) one or more additional light sources having a spatial light intensity distribution and spectral color distribution mounted to said structure where the spatial light intensity distribution of the additional light source is aimed at additional surfaces in the living space,

whereby the greater and lesser concentration of the light sources at particular orientations and aimings on the surface of the illuminating device structure controls the illuminance and color spectrum provided to the predetermined surface areas within the living space allowing for their optimization.

37. [new] The multiple light source illuminating device of claim 36 capable of providing light at optimal levels of illuminance and color spectrum to predetermined surfaces within a geometric living space further comprising:

(q) a first light source having a spectral color distribution and having a substantial directionality of spatial light intensity distribution that is capable of being aimed at a specific surface in the living space; and

(r) an illuminating device structure, said structure having means of being oriented relative to the geometry living space; and said structure having surfaces and apparatus for the mounting of a plurality of light sources thereon; and

(s) said first light source mounted on the structure wherein the spatial light distribution of said first light source is aimed at a first surface in the living space; and

(t) one or more additional light sources having a spatial light intensity distribution and spectral color distribution mounted to said structure where the spatial light intensity distribution of the additional light source is aimed substantially towards said first surface so that the illuminance and color spectrum on the surface is provided at the optimal level; and

(u) further additional light sources having a spatial light intensity distribution and spectral color distribution mounted to the said structure and aimed at additional surfaces in the living space to the extent wherein the optimal levels of illuminance and color spectrum to each of the additional surfaces is provided,

whereby the greater and lesser concentration of the light sources at particular orientations and aimings on the surface of the illuminating device structure controls the illuminance and color spectrum provided to the predetermined surface areas within the living space allowing for their optimization.

38. [new] The illuminating device of claim 37 wherein the optimal illuminance level is uniform illumination over the surfaces at a certain height within the living space whether said surface is directly below the illuminating device or off in a distant corner.

39. [new] The illuminating device of claim 37 wherein the optimal illuminance is increased task lighting illuminance in a certain area of the living space and general lighting illuminance level over the rest of the area.

40. [new] The illuminating device of claim 37 wherein said structure is specifically oriented relative to the geometry living space by being affixed to a surface therein.

41. [new] The illuminating device of claim 37 wherein the light sources are groupings of more than one light source mounted to said structure and where the spatial light distribution aimings of the group light sources are substantially similar.

42. [29] The illuminating device of claim 37 is a lighting application oriented luminaire based on the visual tasks to be carried out within the living space designed according to principles of lighting practice, providing controlled illumination intensity, spectrum, luminous exitance and spatial distribution of intensity and spectrum, suited to the specific lighting application, comprising multiple light sources mounted on said structure, capable when operating in combination, of providing the correct intensity, spectrum, and spatial distribution of intensity, luminous exitance and spectrum for the living space to be illuminated.

43. [30] The illuminating device of claim 41 wherein the intensity, spectrum, and spatial distribution of intensity and spectrum is adjusted for changes in the living space to be illuminated in accordance with the lighting application comprising: a) a means for sensing the changes and b) a means for changing the light emanating characteristics of the light sources, thereby providing the correct intensity, spectrum, and spatial distribution of intensity and spectrum as a function of time.

44. [31] The illuminating device of claim 36, wherein the illuminating device has structure and is a luminaire having functional, accepted comfort and aesthetic characteristics providing controlled illumination comprising:

a) a plurality of light sources having light intensity, spatial light intensity distribution and spectral characteristics, and where said light sources are in mechanical and electrical communucation to the structure such that the spatial light intensity distribution of said independent light sources is having a directionality to said structure and position on said geometric support structure, and

c) wherein the mounting to provide spatial light intensity distribution characteristic, spectral wavelength characteristic, position and directionality of a light source is

determined by using lighting equations to calculate the required light source properties according to one or more of the lighting application requirements, and

d) where said lighting requirements include calculatable items from the list comprised of: illuminance, color temperature and color rendering over the living space to be illuminated and

e) where the luminaire design criterion include any items from the list comprised of: luminous intensity, spectral wavelength distribution, the requirement of maintaining an acceptable continuum of spatial illumination and the requirement of maintaining an acceptable continuum of spatial color effects and the requirement of maintaining an acceptable glare rating for the luminaire, and

f) where the said structure has a considered geometry determined by the requirement of supporting the said independent light sources at the proper aimings and positions on the surface, and

g) where size, shape and coloring of the said support structure is also function of one or more considerations including containing the light sources, the functional ancillary equipment and aesthetic considerations.

45. [32] The illuminating device of claim 42, further comprising elements selected from the group consisting of:

a) a power supply element providing current at a voltage to the light sources and other ancillary equipment; and,

b) a differentiated power supply element capable of varying power to said independent light sources having means to effect the sending or not sending an independent electric power signal differentiated in voltage, current or frequency to each light source or group of light sources; and,

c) a controller for adjusting the power to the light sources to such that a particular amount of power supplied to the light source generates a corresponding intensity and provides the correct intensity, spectrum, and spatial distribution of intensity and spectrum for the application; and,

d) a storage media device capable of storing and recalling stored data relating to performance, algorithms, lighting parameters and,

e) a controller capable of receiving inputs and by means of recalling stored parameters, processing algorithms, and calculating results, generates output control signals to adjust the illumination according to correct lighting practice; and,

f) a photosensor for providing light spectrum and intensity information to the controller, said information for use in said adjusting; and,

g) a motion detector for providing occupant sensing information to the controller, said information for use in said adjusting; and,

h) a communications element coupled to the controller comprised of a receiver for receiving a data signal from an external device, and,

i) a communications element coupled to the controller comprised of a transmitter for transmitting a data signal to an external device, and,

j) a remote control man-machine interface input device capable of communicating data with the communications element; and,

k) a machine vision system comprised of an imaging device, object recognition and,

l) optical elements situated proximate to each individual light source, groupings of light source or all the light sources to control the direction of the emanating light, where the term optical refers methodologies used for redirecting light rays through any of the known phenomenon including: reflection, refraction and diffraction,

m) a mechanical assembly for the support of light sources, power supplies, controllers, sensors and other ancillary equipment and,

n) a satellite reflector receiving light from the luminaire and redirecting said light to illuminate a distant area.

46. [33] The illuminating device of claim 45, wherein said controller is selected from the list consisting of,

a) an open-loop controller, factory programmed, for use in general lighting according to correct lighting practice: and,

b) an open-loop controller, user-programmed, by use of a programming method taking into account the lighting requirements of the environment in which the luminaire is to be used: and;

c) a closed loop controller, user-programmed, by use of a programming method taking into account the lighting requirements of the environment in which the luminaire is to be used; and,

d) a closed loop controller user-programmed, by use of a programming method taking into account the lighting requirements of the environment and self-adjusting in response to the changing lighting requirements of the environment in which the luminaire is located: and,

e) a closed loop controller, self-adjusting in response to the lighting requirements of the environment in which the luminaire is located, without pre-programming.

47. [34]A method for constructing a multiple light source illuminating device capable of providing light at optimal levels of illuminance and color spectrum to predetermined surfaces within a geometric living space comprising the steps of:

(d) providing the illuminating device with a structure which is capable of being oriented to the geometry of the living space; and

(e) providing said structure elements for mechanically and electrically joining the light sources to the structure; and

(f) positioning light sources in greater and lesser concentration at particular orientations and aimings on the surface of the illuminating device structure to provide meted illuminance and color spectrum to differently positioned and distanced surface areas within the living space whereby the illuminance and spectrum is at optimal levels.

48. The method of claim 47 further comprising the steps of:

(d) determining the illuminance and spectrum requirements of the lighting application and visual tasks to be carried out within the living space; and

(e) determining the illumination area, distances of from the illuminating device of the surfaces within the living space to be covered; and

(f) determining the light source intensity, spatial intensity distribution, spectral wavelength characteristic and directionality aimings of the multiple light sources mounted on said structure which meet the said illuminance requirements.

49. [35] The method for designing the illuminating device of claim 47, designed according to lighting practice, providing light intensity, spectrum, flare related luminous exitance and spatial distribution of intensity and spectrum, suited to the living space to be illuminated further comprising steps selected from the group consisting of:

(a) determining the lighting application, and the recommended lighting practices, illumination and glare ratings required for the application; and
(b) determining the luminaire mounting height, illumination area covered and surrounding conditions of the application; and
(c) determining light power required to effect the required illumination over the area; and
(d) selecting light sources capable of producing required intensities and spectrum at highest conversion efficiencies at lowest economic cost; and
(e) determining light source beam spreads; and
(f) determining light source aimings for the required distribution pattern; and
(g) determining electronics to control and power light source; and
(h) determining lighting fixture surface geometry size and glare rating; and
(i) testing whether the glare rating for the viewing angle is acceptable; and
(j) if the glare rating is not acceptable, changing light source beam spread and fixture geometries, or size, resulting in an acceptable glare rating; and
(k) when the glare rating is acceptable, then designing the luminaire aesthetics for the application.

Very respectfully,

Yechezkal Evan Spero

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